

Out of the *Blue*

A nature-based armature for
urban development

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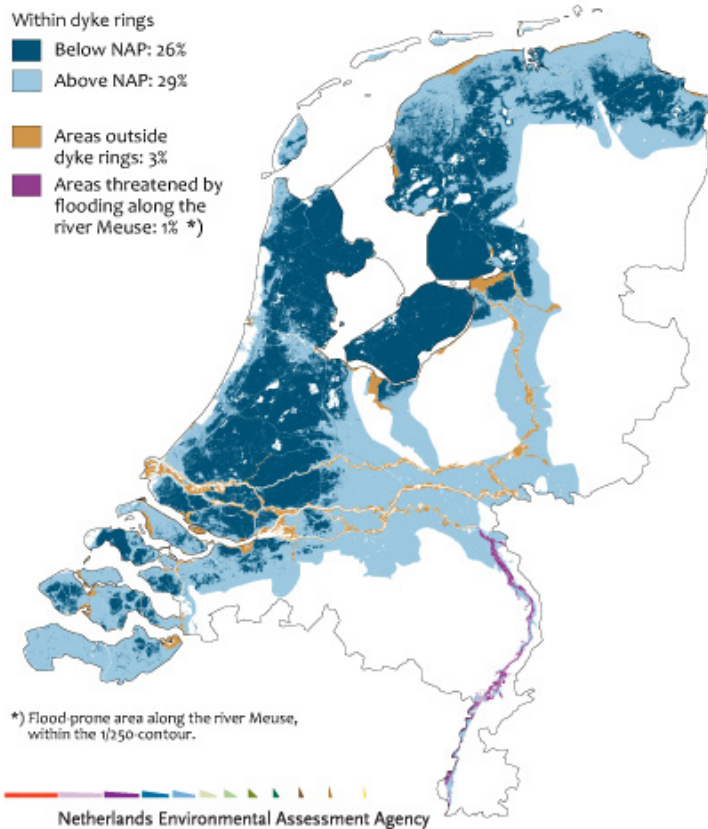
“Without water no life”

(Tjallingii, 2012)

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Flood-prone area



Flood risk zones (Netherlands Environmental Assessment Agency, 2007)

Introduction

Motivation

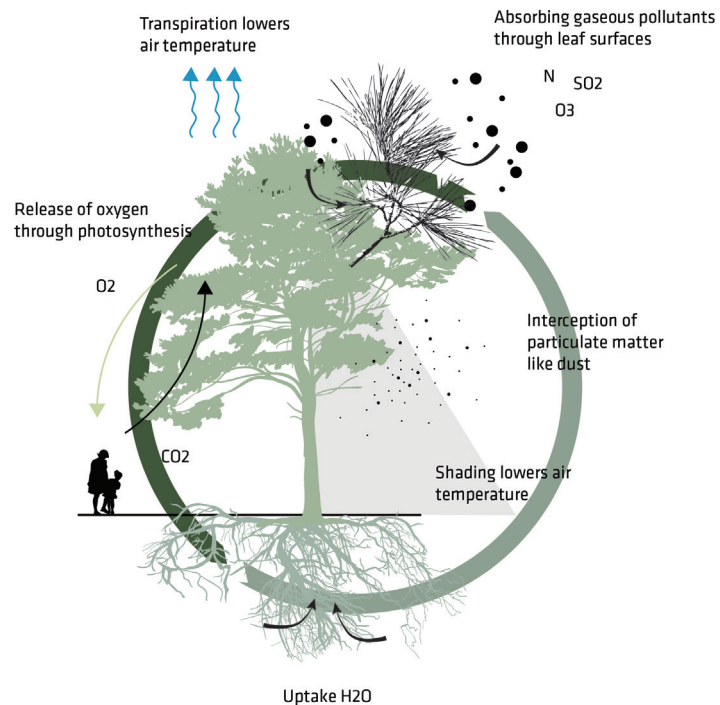
The first important decision I ever had to make was choosing my major. This was my first step into the complexity and responsibilities of adult life. At this young age, I was not really sure of what I wanted to do in the future, but my strong interest in nature, combined with my abilities to think logically and solve problems, invited me to explore this exciting career choice where I can develop my interests and skills in an integral way, while at the same time gaining the comfortable awareness of my capacity to make a positive difference in my environment.

Being born in a country, the Netherlands, where water management is a big issue, it made me aware of the significant value of the environment and the dramatic importance of taking care of it. I therefore chose to attend both universities, HAS University of Applied Sciences and The Oslo School of Architecture and Design, that have a strong focus on natural systems, including topics such as soil, geology and water. My knowledge of plants, having learnt more than 600 during my bachelors, gave me great insight about plants in a total different way, with their own unique characteristics being able to benefit humankind becoming to known as ecosystem services. This passion evolved during my first semester at the AHO, where I got the chance to redevelop the Oslo Botanical garden. By working with the specific site conditions and the ephemeral approach of seasons, I got a true passion for this project. My second semester consisted of "a Motorway called Rio" in San Luis Potosi, Mexico. The studio investigated the transformation of a motorway named Boulevard Río Santiago and researches in what ways the rethinking of a key infrastructure could trigger an environmentally and socially just development of the urban habitat. With a changing climate and a growing city, has become highly problematic: Recently occurring heavy rains, causing flooding of the motorway bringing the city to a collapse. The motorway's trouble is prototypical (and a metaphor) for the challenges of contemporary cities and will serve as the spatial spine and conceptual entry point for engaging necessary transformations towards a city that is able to consolidate environmental systems, urbanization pressures and a culture of social participation. Working within this totally different climate, culture and site conditions, I started to question what impact climate change would have in Scandinavia, located in a climatic zone much colder than Mexico and waiting for heavy downpours to come. How will it affect urbanized areas and the people living in it. Is there a way to prevent areas from flooding or adapt to the increasing downpours and at the same time improve social life.

The multidisciplinary way I can approach projects based on physical conditions, geography and climate inspire me. My goal is to become a creative and integral professional with technological knowledge and audiovisual communication skills, that addresses these issues of climate change in relation to social life. While pursuing my Master's degree, I will grow and prepare to make a difference around me through smart, proactive and positive solution finding.

Out of the blue

Over the last decade, people have finally become more aware of the issues of climate change, from pollution to excess and scarcity of water. Cities have been adapting and focusing on small scale interventions but haven't much been looking at the bigger territorial scale. Within the near future, climatic issues will increase. Heavy precipitation events, causing river and urban flooding will eventually threatening the safety of life in cities. Therefore, the need for adaptation is becoming urgent. With the changing climate, rapid population growth and current policies, the Greater Oslo Region is facing high pressure to evolve. The main question is how we can inhabit space by engineering for human, looking from an aesthetic and ecological infrastructural approach. With the help of nature's ecosystem services, cities can obtain a more robust and sustainable framework with a new sense of community, quality of life and a whole new perspective on what green is.



Example of Ecosystem services



Arctic region

- Temperature rise much larger than global average
- Decrease in Arctic sea ice coverage
- Decrease in Greenland ice sheet
- Decrease in permafrost areas
- Increasing risk of biodiversity loss
- Some new opportunities for the exploitation of natural resources and for sea transportation
- Risks to the livelihoods of indigenous peoples

Atlantic region

- Increase in heavy precipitation events
- Increase in river flow
- Increasing risk of river and coastal flooding
- Increasing damage risk from winter storms
- Decrease in energy demand for heating
- Increase in multiple climatic hazards

Mountain regions

- Temperature rise larger than European average
- Decrease in glacier extent and volume
- Upward shift of plant and animal species
- High risk of species extinctions
- Increasing risk of forest pests
- Increasing risk from rock falls and landslides
- Changes in hydropower potential
- Decrease in ski tourism

Continental region

- Increase in heat extremes
- Decrease in summer precipitation
- Increasing risk of river floods
- Increasing risk of forest fires
- Decrease in economic value of forests
- Increase in energy demand for cooling

Mediterranean region

- Large increase in heat extremes
- Decrease in precipitation and river flow
- Increasing risk of droughts
- Increasing risk of biodiversity loss
- Increasing risk of forest fires
- Increased competition between different water users
- Increasing water demand for agriculture
- Decrease in crop yields
- Increasing risks for livestock production
- Increase in mortality from heat waves
- Expansion of habitats for southern disease vectors
- Decreasing potential for energy production
- Increase in energy demand for cooling
- Decrease in summer tourism and potential increase in other seasons
- Increase in multiple climatic hazards
- Most economic sectors negatively affected
- High vulnerability to spillover effects of climate change from outside Europe

Observed and projected climate change and impacts for the main biogeographical regions in Europe (EEA, 2017)

Thesis Outline

Inhabit space by engineering for human

Over the last decade, people have finally become more aware of climate change and the consequences being detrimental, to both cities and their wider environment. Climate mitigation strategies are being implemented as small scale design interventions like swales and raingardens to prevent the urban fabric from flooding. However, rapid population growth is causing further urban densification and the water issues are increasing in its scale and urgency in the years to come. Rainstorms, floods and erosion will eventually threatening the safety of life in cities. Instead of looking from a landscaping repertoire of small scale interventions, we should investigate more on a wider scale, as a territory constructed around its water flows and cycles.

Within the Greater Oslo Region, urban development is shaped by diverging forces understanding the territory as a backdrop. Waters have been pushed into technical infrastructures to create a safe and modern urban living. Accelerated by a changing climate with increasing impermeable surfaces, the redistribution of storm water and an aging mixed-water sewage system, the cities are creating its own environmental problems. Yet, casting a light on the geographical and social territory with its embedded policies of access and fragmentation. The question rises of how we can inhabit space by engineering for human. By mapping the flows and frictions, one of the "clashes" reveals in Lørenskog, a small-scale rapid growing municipality situated in a floodplain, in the county of Akershus.

Water-based urbanism - a territorial challenge for the next century

Climate change vs population growth; A territorial challenge for the next century is rising. Cities in northern Europe will face rapid urban growth and suffer from increasing heavy precipitation events, causing river and urban flooding. Urban planners have become more aware of the consequences, resulting in adaptation projects like "the Water square" by de Urbanisten in Rotterdam, the strategy of "Room for the river" by Rijkswaterstaat and "A Resilient Landscape: Yanweizhou Park" in Jinhua City by Turenscape. However, the huge lack of site specific, adaptive solutions towards water-based urbanism (Shannon, K. 2013) in Norway show the need of investigation. Within the Greater Oslo Region there is an increasing awareness on the crisis of the metropolitan water cycle. Nonetheless, current policies and projects show a lack of a cohesively articulated attitude of the region to its water system. Tackling this issue, will positively influence the future development of cities and their wider landscape and region. Opportunities lie in opening up a new approach towards urbanism, exploring ecological infrastructure as place-maker within the wider territory. By examining the case, it can contribute to the image of the Oslo Water Metropolis, "The project focuses on landscape in relation to the project of the metropolis – the possibility of imagining and realizing a coherent form and image of the space of inhabitation. The project proposes the image of Oslo Water Metropolis, as a tool for elaborate descriptions and projections that are able to inspire visions, projects and policies. The aim is to stimulate a dialogue in the Oslo region, to transfer knowledge from relevant experiences and models, and to invite experts and regional actors to engage in a research-by-design." formulated by Zaccariotto, 2017.

Exploring ecological infrastructure as place-maker within the wider territory

As an approach, I would like to refer to Stokman, 2008:

“The strength of landscape architecture lies in its ability to extend our current understandings of infrastructure, linking the performance of natural processes with engineering and urban design strategies.”

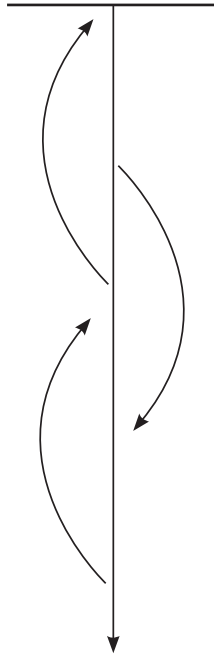
During my diploma I would like to investigate and learn from existing projects and models by implementing them in a different way. Instead of providing an acupuncture small scale design approach, I would like to investigate in big scale adaptation interventions and the effect it may have on the social, geological and urban territory of Greater Oslo. The challenge is to realize an urban framework that is based on water and green as ecological infrastructure, contributed by ecosystem services. Sketching out a radical hypothesis of what would happen if parts of the city are being transformed and incorporate nature, resulting in learning to read the territory as a whole where developments will emerge, be re-invented or even be dismissed. Additional scenario's, looking from the front and back end of the water system, and specific calculations on the water issues in collaboration with the municipalities and engineers will contribute to the design proces.

The following research questions from the disciplinary discourse will be addressed:

- How can the beauty of nature be reflected, by measures of dissecting, isolating and framing?
- How can programming of space, initiate resettlement and address human-ecological challenges within the landscape practice?
- How can water create opportunities for a more robust and sustainable urban framework, while improving the city's economical and social life?



Ellingsrudelven (Elisabeth Ulrika Sjødahl, 2016)



Movement between scales

Organisation

Approach

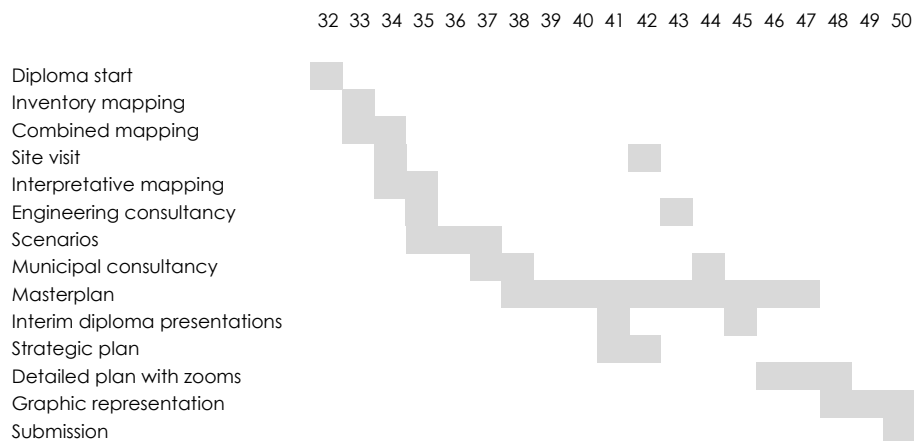
My diploma will be a "svennestykke" (test piece of work for finishing one's apprenticeship) in the traditional sense, and prove a high level of technical proficiency or professional know-how.

Within my diploma I will practice a multi/cross-scalar way of working, which will be based on a territorial approach, anchoring local design in the wider geography, region, the watershed. It will investigate the Greater Oslo Region as a territory constructed around its water flows and cycles. With a high urban development pressure from a hydrological and landscape perspective, the main focus will be on the municipality of Lørenskog. It searches for the utopian within and speculates on a radical counter image to what the city is today.

Material

The diploma will create interpretative maps and projective cartography to create analysis and strategic scenario development. A collaboration with the engineers, will lead to an understanding of the volumes of water in the different seasons. From this strategic approach, concrete designs will be proposed. It will involve a multi-scalar ability to move between the architectural, urban and territorial scales. The interrelated and multi-layered issues of ecological, urban and social sustainability will be addressed from the perspective of architecture, urbanism and landscape architecture.

Schedule





Overview Lørenskog area
(Lasse Tur, 2007)



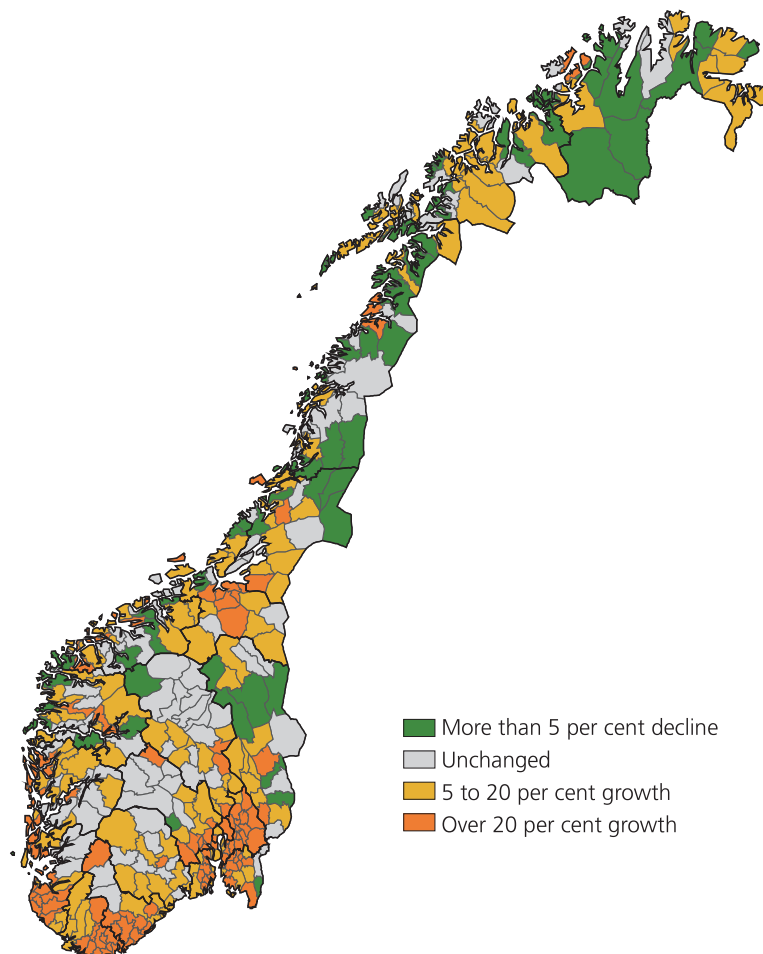
Regional suburban areas vs extreme local village scale
(Wilhelm Joys Andersen, 2010)

Research Area / Site

Urban growth

The municipality of Lørenskog is located within the county of Akershus, in the Greater Oslo Region. It consist of more than 37 000 inhabitants per the year 2017. Within the total area of 71km², more than half of the land is occupied by the Østmarka forest. In the last 30 years, the municipality grew from an agricultural city towards an urban suburb of Oslo. This happened in the 1980's when the municipality built both the Lørenskog Storsenter (Triaden) and Metro-senteret, currently attracting visitors from all over the Oslo and Romerike district. Since then, it became a self-regulating city with shops and job opportunities.

With its strategic base on the highway, in between the municipality of Oslo and the Oslo Gardermoen Airport, densification of logistic and commercial areas keep on evolving. Heavy infrastructure is serving the industry, taking all the space available. The regional development is now more and more taking over the extreme local housing scale, pushing the inhabitants away.



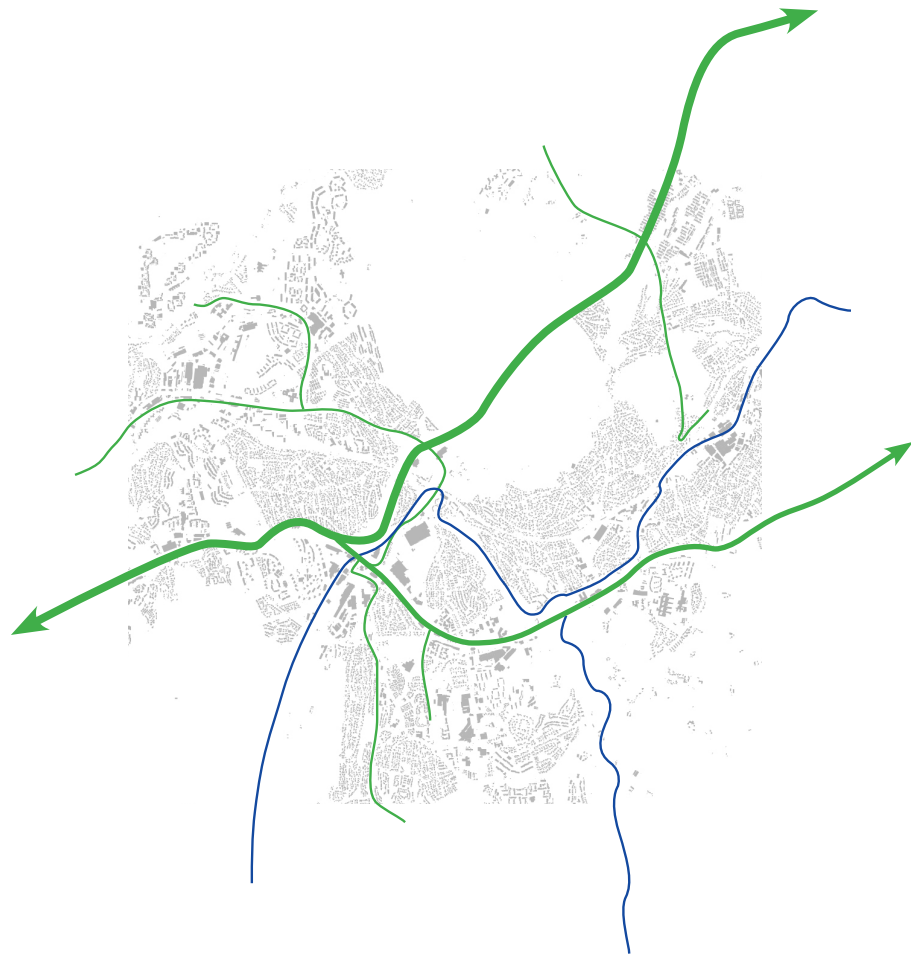
Source: Statistics Norway. Map data: Kartverket

Projected growth rate in the municipalities of Norway 2016-2040, main alternative (MMMM)

Climate challenges

In addition, with the changing climate, Lørenskog is facing several environmental problems, mainly related to flooding of the urban fabric. Due to high precipitation events, impermeable surfaces and a thin topsoil, the river keeps on overflowing causing major issues on the urbanized areas. The question of suitability of development towards the territory is rising. Now that the flooding issue is becoming an often discussed problem, it will give political power and potentials for change.

Situated in an aesthetic natural landscape with current proposals of bringing the Østmarka back into the city, opportunities for a blue/green network strategy are rising. Hereby, blue is related to water-based elements and green to vegetation-based elements. By connecting and managing the two elements in conjunction as a blue/green network, while recognising their relationship to urban grey space, a number of benefits can be achieved.



Blue green potential network strategy

1983



Flooding Lørenskog station 1983 (Morgan Andersen, 2015)

2015



Flooding Lørenskog station 2015 (Lisbeth Andresen, 2015)

2007



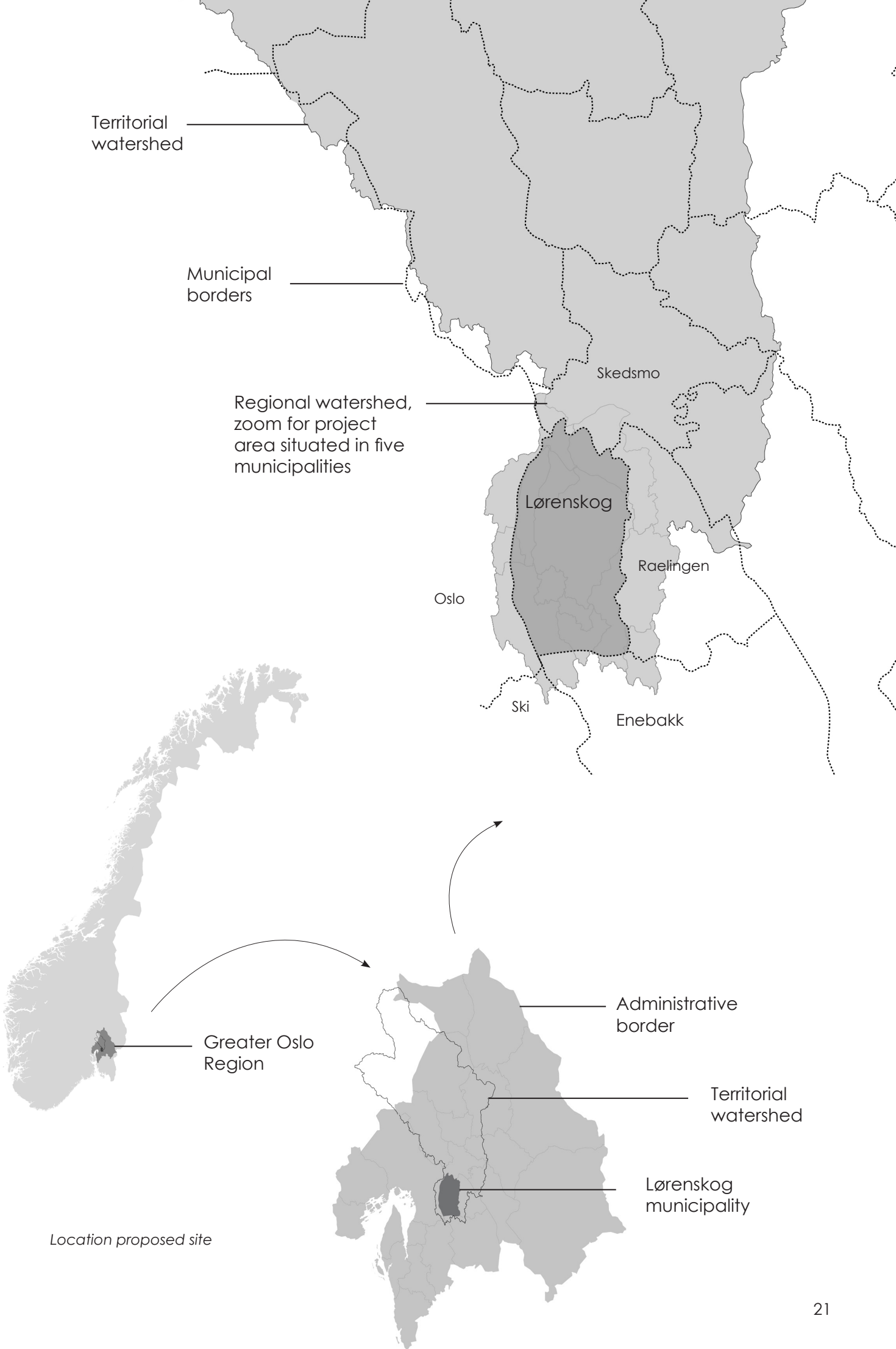
Flooding Lørenskog station 2007 (Geir Egil Skog, 2010)



*Natural landscape Østmarka
(Lasse, 2011)*

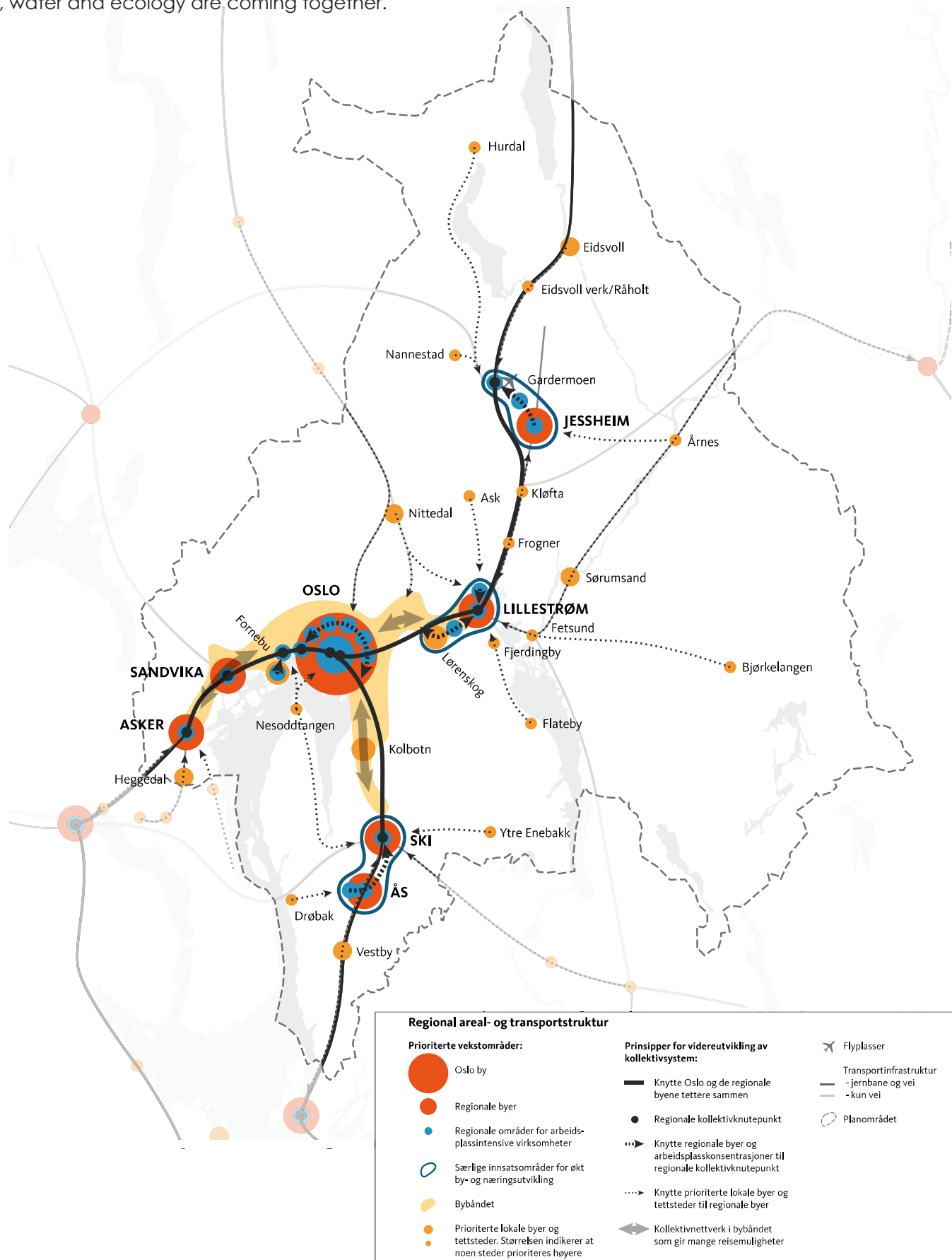
Bridging space

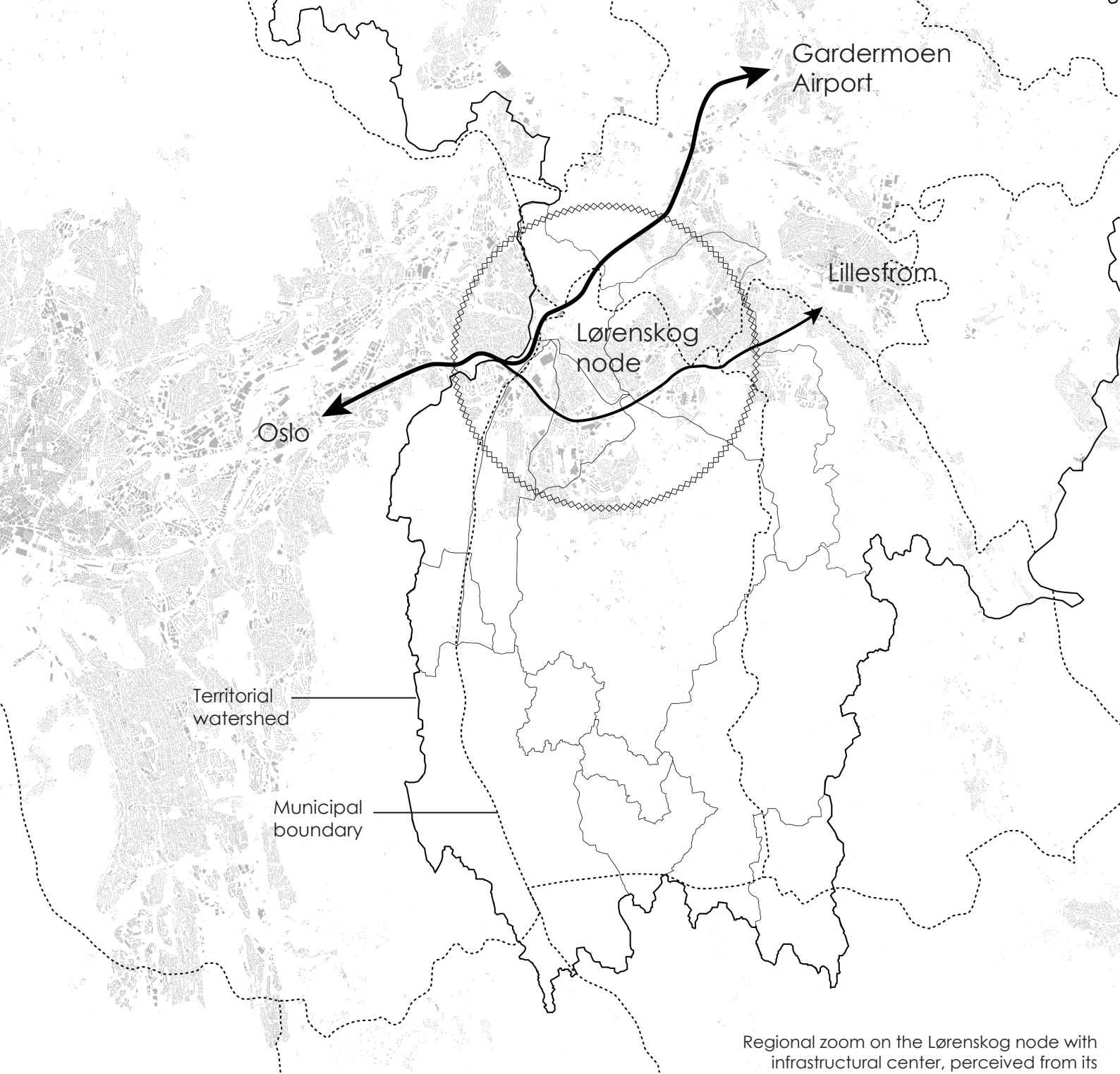
To face the current issues, the area will be approached from a territorial scale, starting from its watershed. Hereby, the project will cross five municipal borders: Oslo, Lørenskog, Ski, Enebakk, Rælingen and Skedsmo. Conceiving the space from its watershed, including the different municipalities, will give a new refreshing view on the situation.



Lørenskog node

In the regional plan of transportation in Oslo and Akershus, the Lørenskog municipality is perceived as a city node highly potential for urbanization. However, zooming in on the node, shows a more complex situation. Questions of infrastructure, urbanization, industry vs housing, soil, water and ecology are coming together.

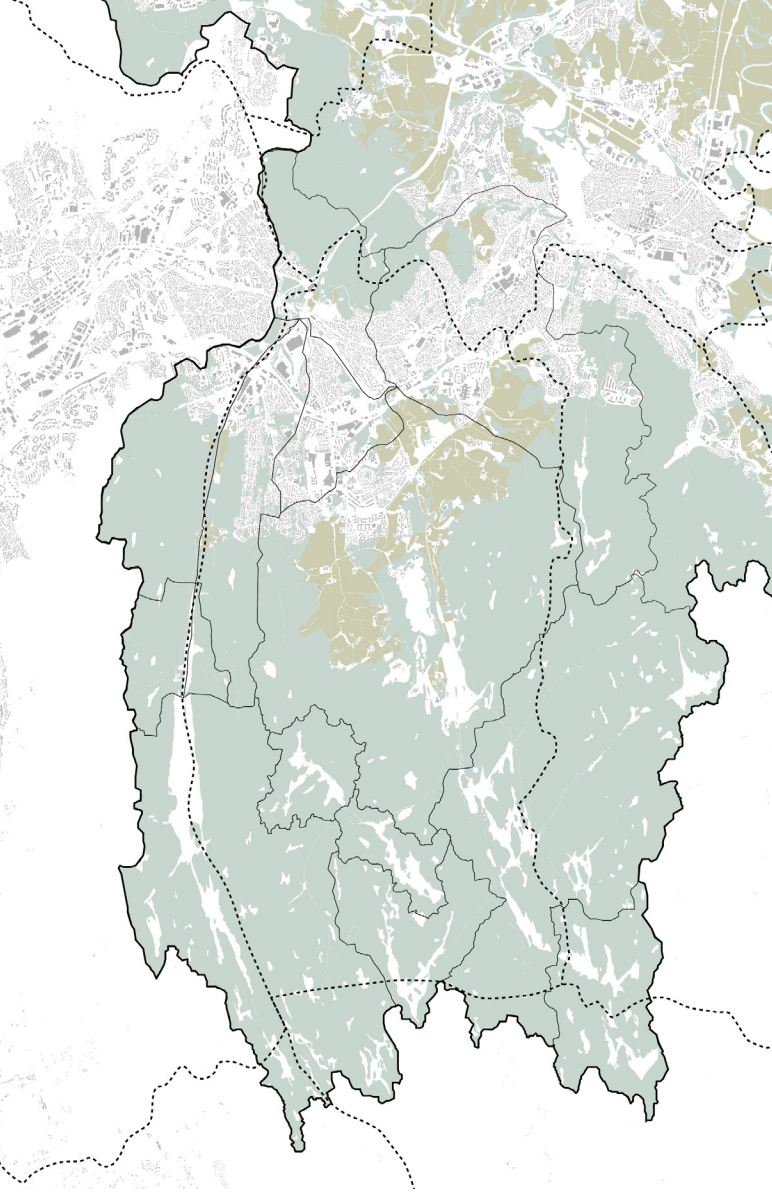




Regional zoom on the Lørenskog node with infrastructural center, perceived from its watershed



Infrastructural node (Elisabeth Ulrika Sjødahl, 2016)



Urbanization is taking over the Østmarka forest, even though the forest has great aesthetic and social potential



Topography leads all the water towards the urbanized areas





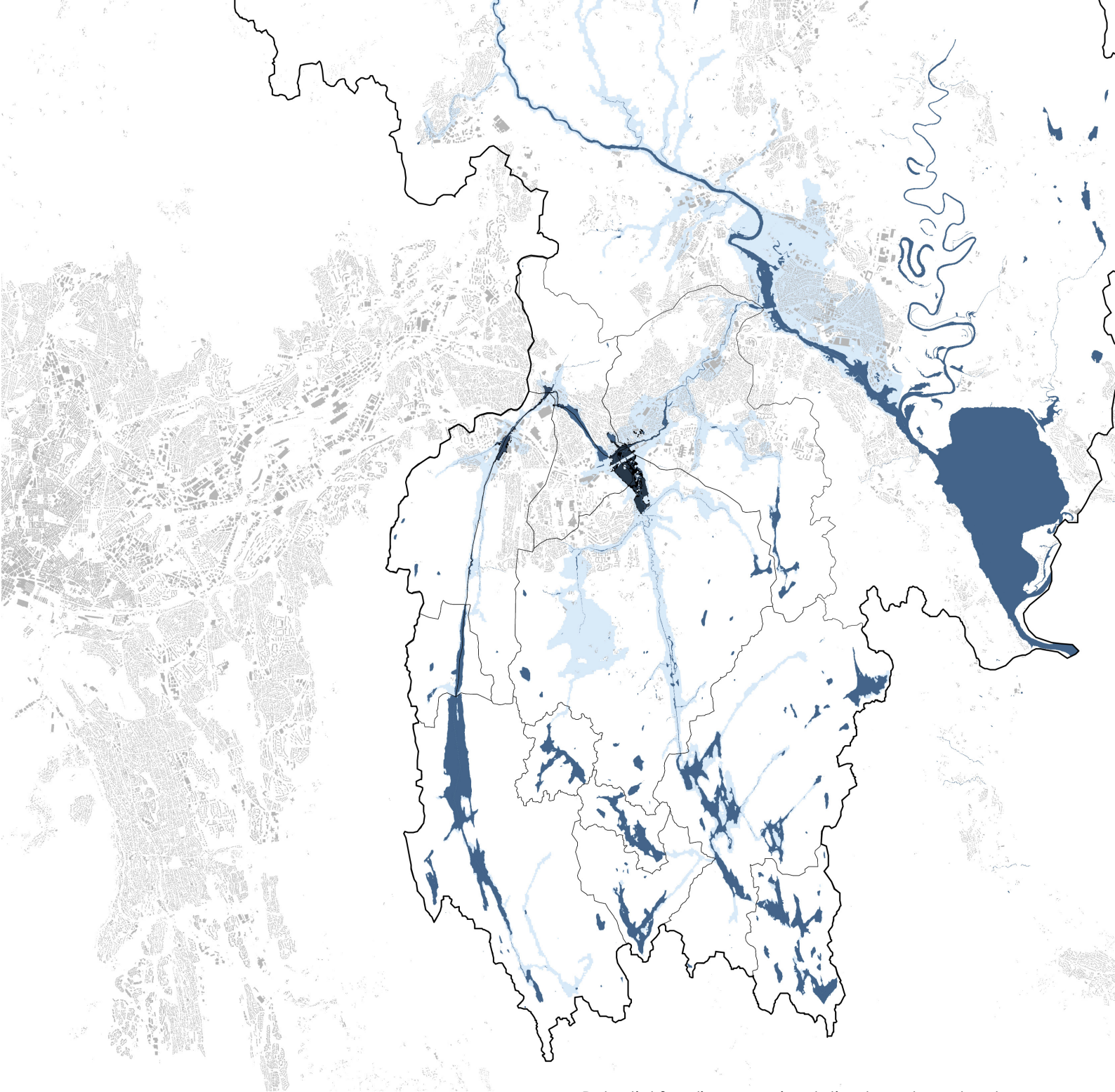
The thin loose top soil layer doesn't give water the opportunity to infiltrate during heavy precipitation events, causing urban flooding



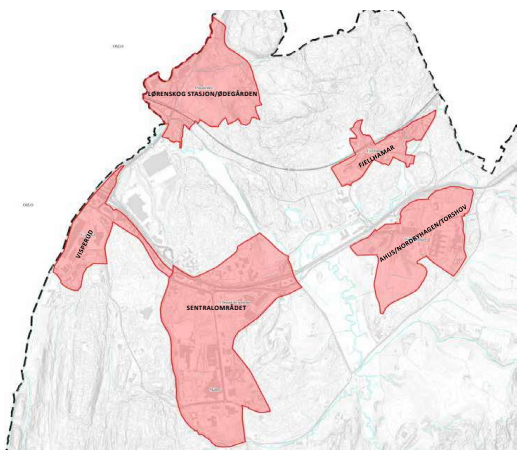
Depressions are localised along the urban fabric



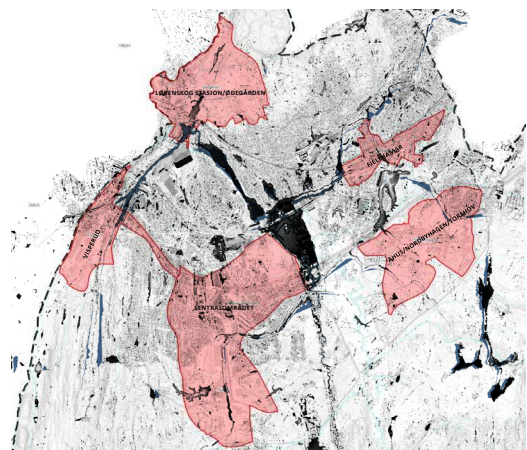
Lørenskog areal view (Krogsveen, 2017)



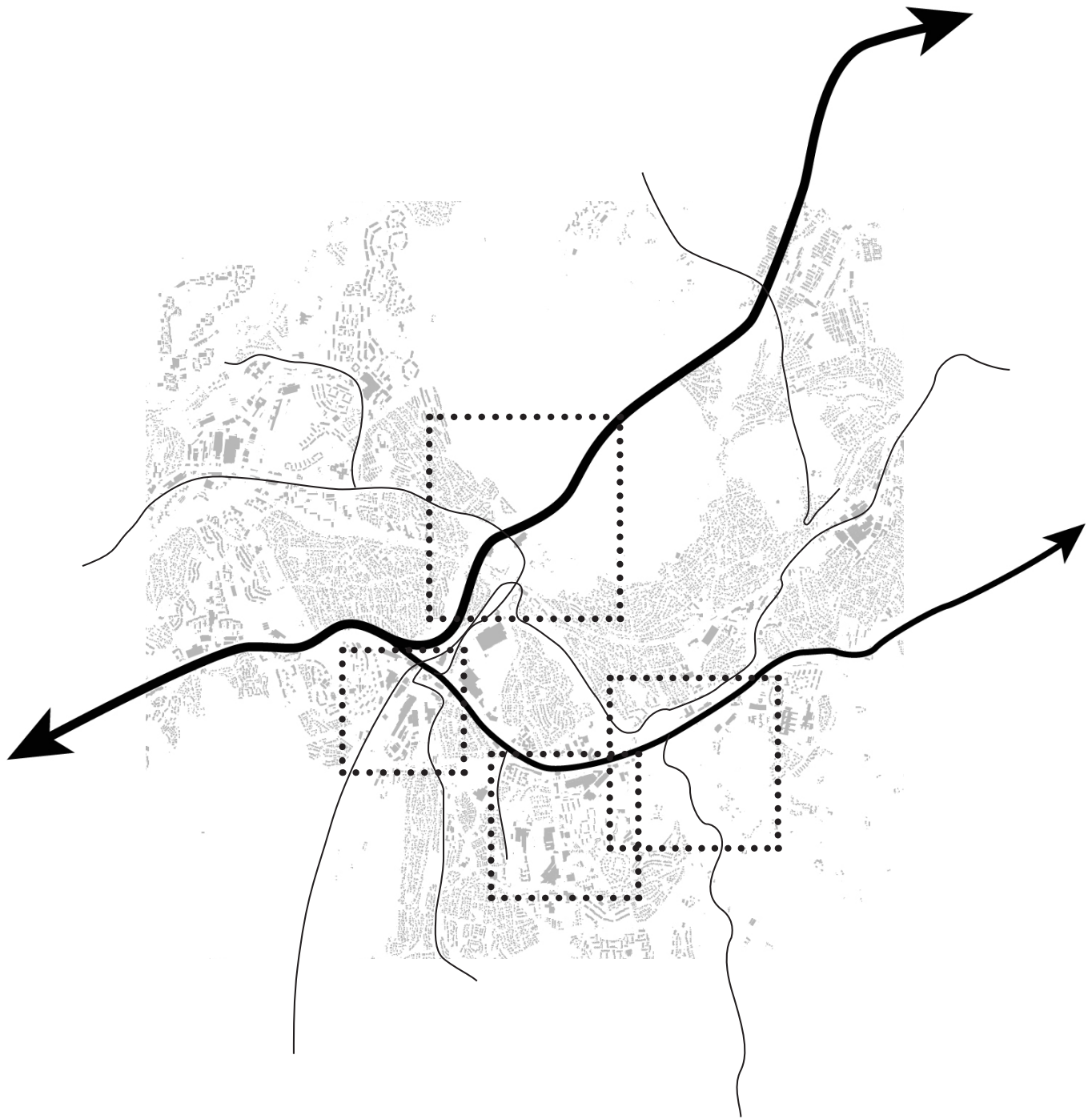
Potential flooding areas in relation to water network show issues which will increase in time



Cuurent urban development plan (VPOR Lørenskog sentralomrade, 2017)



Urban development "clashes" with depressions and flooding area



Blue green structure approach with potential zooms

Landscape strategy

The analyses clearly reveal the issues related to future urbanization and heavy precipitation events in the Lørenskog area. However, surrounded by an aesthetic natural landscape with its seasonal character, the area shows high potential for change. With the political power, this project can become a "svennestykke" (test piece of work for finishing one's apprenticeship) in the traditional sense, and prove a high level of technical proficiency or professional know-how. Therefore, the aim is to develop a landscape based plan for the Lørenskog node, where the aesthetics of ecological infrastructure is based for urban development.

References

Literature

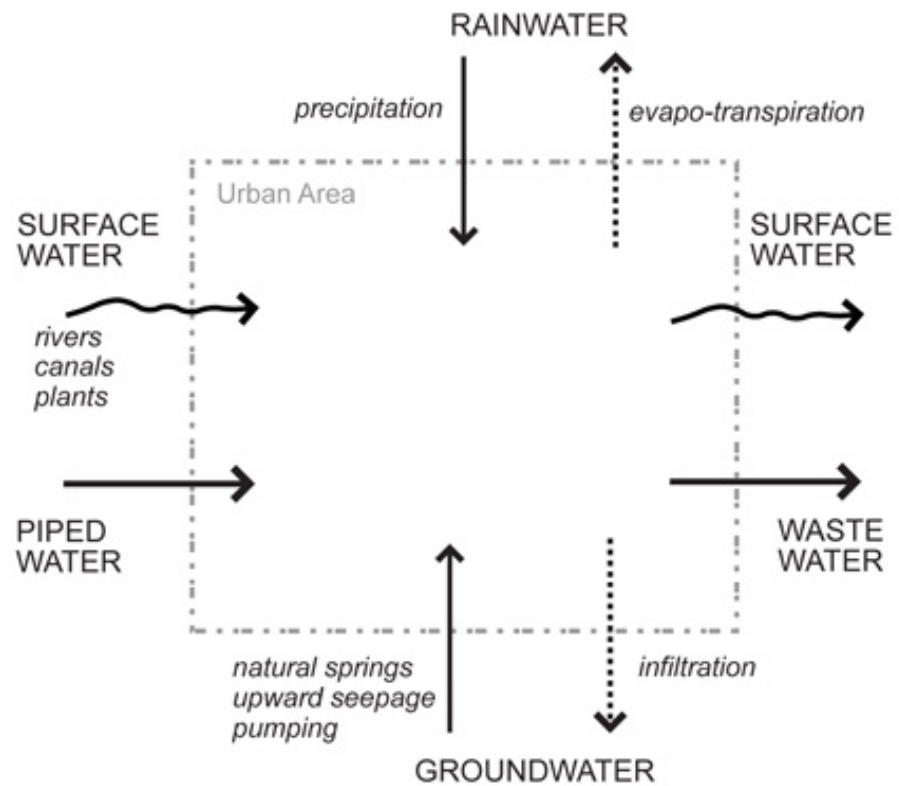
Tjallingii, S. (2012) Water flows and urban planning, in Bueren, E. van, H.van Bohemen, L. Itard & H. Visscher (eds.) Sustainable Urban Environments - An Ecosystems Approach (Springer. Dordrecht/London/NewYork)

'Without water no life' (Tjallingii, 2012, (p.3)). Sybrand Tjallingii, a landscape ecologist, discusses the relationship between water flows and urban planning. He hereby focusses on the role and issues of water in urban ecosystems from a design, management and planning point of view.

Living in an era where cities keep on expanding, the urban water demand is reaching its limits of their available regional water resources. Water scarcity becomes a real issue, just like cities suffering from having too much water or being effected by pollution but they are also creating these issues by dumping industrial waste into rivers, having an insufficient water system and constructing hard surfaces where water can not infiltrate. As a result, the question of sustainable water use is becoming more and more urgent. Tjallingii, therefore, urges urban planners to develop robust solutions that integrate water as an element to make cities more livable and attractive. As the author aims: "The city should be good for water, but water can also be good for the city" (Tjallingii, 2012).

Within the reviewed paper, the author addresses the role of water in urban ecosystems starting from an understanding of the water cycles in the urban context and the role of cities within their hydrological cycle. From this understanding, planners and technicians can question how to steer these flows to create opportunities for sustainable and visible combinations of economic and social life within the built environment. Guiding models give opportunities from the small scale of individual houses up to the regional watershed. When implementing these models, actors will play a major role in these processes. Learning from approaches like 'command and control' and 'interactive processes', a new approach is adopted: Learning from existing guiding models towards new sustainable urban water cases. Success stories start by learning from what has already been done.

As a conclusion Tjallingii gives a six steps summary that will lead towards new sustainable urban water systems: Starting by analyzing and understanding the water cycle in the regional system, making up the water balance by quantifying the in- and outflows of the planning area, using the guiding principles of cascading and closing the water circle, translating the guiding principles into guiding models related to the organization of space, considering water in the urban landscape as the Two Networks Strategy of water and traffic networks as a guiding model and finally by using these guiding models to create a common language between actors to propose change.



Urban areas and the waterbalance (Tjallingii, 2012)

Research question:

How can water create opportunities for a more robust and sustainable urban framework, while improving the city's economical and social life?

Evaluation

The concluding summary stated in Tjallingii's essay, may act as a method for future research on my chosen topic and site, to work towards sustainable urban water systems.

Shannon, K. (2013) *Eco-Engineering for Water: From Soft to Hard and Back*, in *Resilience in Ecology and Urban Design: Linking Theory and Practice for Sustainable Cities*, Future City Series, vol. 3, pp. 163-182

Kelly Shannon, a graduated architect, focuses on the development of robust landscape structures to deal with contemporary design challenges at the urban and territorial scale. With a design research at the intersection of urbanism, landscape, projective cartography and interpretative mapping all over the world, she addresses and summarizes opportunities in the changes of water-based urbanism.

Water-based urbanism is addressed with a focus on eco-engineering for water: From soft to hard and back. Throughout the centuries the natural landscape has been transformed into a cultural landscape. Through these changes, soft surfaces turned into hard surface which makes it hard for water to infiltrate. This is causing a lot of problems. Within this text, the object exemplifies designs with water from Europe and South East Asia. The main idea is, as described by Shannon (2013), "to integrate new soft engineering approaches in the planning and development of the cities of tomorrow." This means that they have to work with the forces of nature to reduce the impacts of natural disasters. The author chose to study this object because extreme weather is causing natural disasters all over the world. It is facing environmental, financial and humanitarian issues that need to be addressed. Water urbanism has changed and is facing pressures to evolve. These pressures include a shift to urbanism based on transport by roads, and the main need to adapt to changing climate and rising sea level.

Uneven distribution of scarce water resources, global warming, extreme problems of drought, rising sea level, pollution, water storage and affected watersheds are examples of these serious urban issues. This leads to the authors explicit values of creating a renewed relationship between city and nature.

The intended audience are architects, urban designers, landscape architects and engineers to make them more aware of the existing problems which the world is facing and try to address them.

Examples in Europe and South and East Asia are used of opportunities to improve urban resilience. As an example, Asia's tropical monsoon belt is a huge infrastructural project where they efficiently use the seasonal watercourses, design building methods which adapt to flooding and storage the monsoon rains for use in dry season. In Europe the slogans "room for water" and "space to the river" and terms such as eco-swales and SUDS (sustainable urban drainage system) are being used. The projects that relate to these topics are rainwater gardens, reconstructed wetlands and flood adaptive landscapes. These projects are all concepts that work with natural forces in the development of a resilient water-based urbanism which supports the authors thesis.

In an era when nearly all is possible with technology and money, people have finally become more aware that consequences can be detrimental, to both cities and their wider environments. With this conclusion, cities need to find a way to redefine harmonious, dynamic balances between city and nature. Water will play a major role in this process.

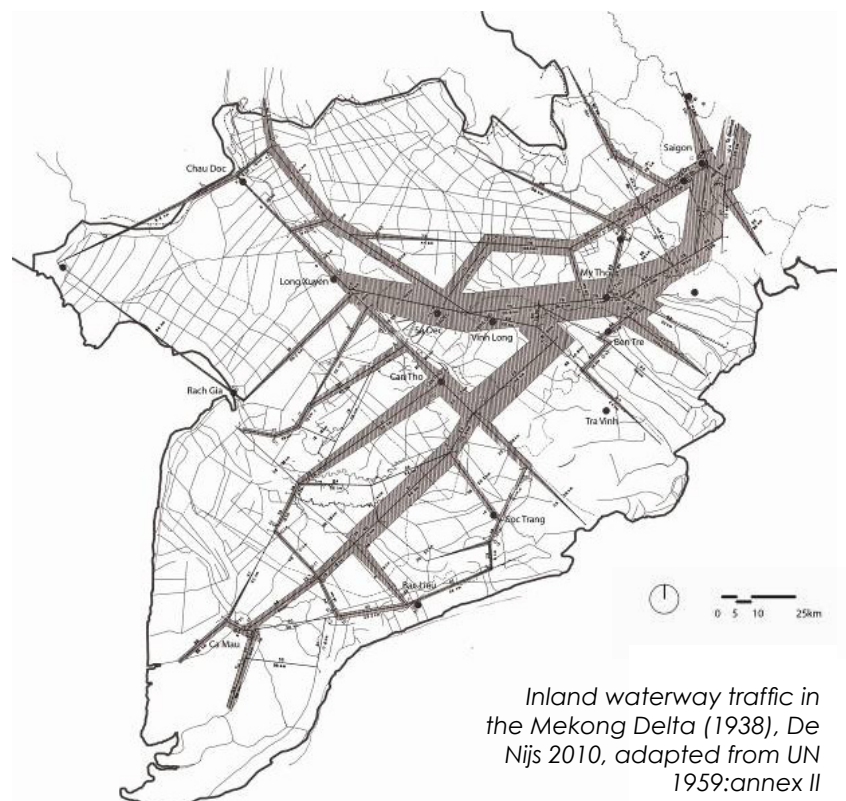
Research questions:

How can design research at the intersection of urbanism, landscape, projective cartography and interpretive mapping summarize opportunities for water-based urbanism all over the world?

- How can eco-engineering for water, with the transformation from natural landscapes towards cultural landscapes, contribute to the planning and development of the cities of tomorrow?
- How can water structures urban development?
- How can cartography and interpretive mapping be the base of water based urbanism?

Evaluation

I see myself focusing on the development of robust landscape structures to deal with contemporary design challenges at the urban and territorial scale. By personally having experienced variable areas in the world, differing in culture, climate, geology, vegetation and exploring the changes in climate, I am eager to investigate Shannon's perspective on design research at the intersection of urbanism, landscape, projective cartography and interpretive mapping to address and summarize opportunities in the changes of water-based urbanism.



Tjallingii, S. (2015) Planning with water and traffic networks. Carrying structures of the urban landscape. Research In Urbanism Series, 3(1), 57-80. doi:10.7480/rius.3.832

Planning the urban landscape can be done by implementing multiple networks. In the reviewed paper, Sybrand Tjallingii, a landscape ecologist, explores the so called two networks strategy that serves as a conceptual tool for planning and design. The main goal of this strategy is to give an overall guideline for both planners as designers to develop strategic plans for cities. The guiding model takes the networks of traffic and water as the carrying structures. Now that the method has been implemented into different projects, Tjallingii reflects on it. By reviewing the strategy, additional information can also be used for contemporary debates about landscape as infrastructure and landscape urbanism. In order to create this urban landscape, there is a need for three carrying structures: the area its perspective, the flows that pass through these areas and the actors who are involved in the design process. These combined elements create two multi-functional environments of synergy, the fast and slow lane. The fast lane consists of production and profit which is carried by the traffic network. The slow lane consists of the natural processes carried by the water network.

Rapid industrial and urban development in the sixties and seventies triggered a movement of environmental awareness. For this reason, environmentalists and urban designers had to expand their horizons and work together, resulting in a new approach: sustainable development. One fruitful outcome is the two networks strategy. Tjallingii discusses several cases against his strategy, but objects them with both precedents as conducted studies.

Firstly, urban planners are often not convinced about methods like the two networks strategy. In their opinion this conceptual model works in new urban developments, but not in existing projects. However, the author mentions the Schalkwijk precedent in Haarlem, which demonstrates how this method worked in an existing condition.

Secondly, the approach combines territorial structures with flow management. The flow perspective is similar to the 'cradle to cradle' approach (McDonough & Braungrat, 2002). However, this approach describes the process of 'remaking the way we make things', which is related to industrial ecology. The traffic and water flows need to respond to natural happenings like storage and the design of intersections, and therefore not only about recycling. This multi-functional approach of the strategy fits even better in the 'Blue Economy' (Pauli, 2012).

Thirdly, the ecological footprint (Rees, 1995) suggests a small footprint. This idea stimulated designers to develop self-sufficient neighborhoods. The strategy does not discourage these developments, but offers a way to find unity between factors.

Fourthly, the strategy creates a frame for decisions to adequately change the world. This frame exposes the problems but does not solve them (Schön, 1983 [1991: 40]). By measuring the actual need of an aspect, it will play a role in the process of deciding. This step usually occurs in a later stage of planning. The strategy however, deals with uncertainty. One cannot predict the future when it comes to climate change. With the two networks approach, one creates a flexible and durable frame that is responding to these changes.

Fifthly, more attention is being paid to the industrial ecology than to the landscape ecology. The guided model offers a chance to combine

two strategies, but it seems that the aspect of infrastructure is not clear (Bélanger, 2013). In the network of carrying structures it has been noted that it can be of great importance to add infrastructure as one of the three layers.

Finally, the water and traffic models help planners and designers with their design process. These models are almost identical to the pattern language of Christopher Alexander (Alexander et al. 1977). However, different patterns often create confusion between designers. As McHarg mentions: "form follows nothing - it is integral with all processes" (1969 [1971: 173]).

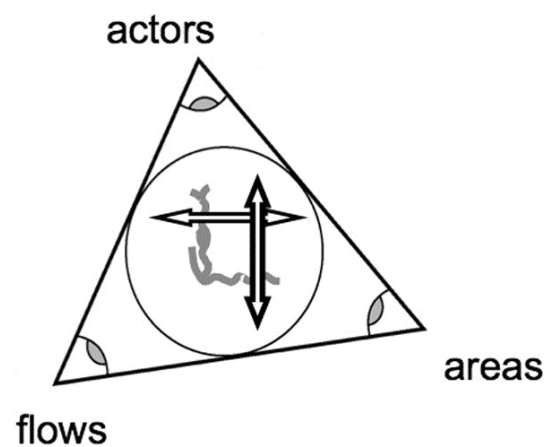
In conclusion, the discussions of experiences with the two networks strategy show that the water and traffic networks can be used as carriers for urban development. By learning from practice, the strategy has been upgraded and expands the understanding of an area, flow and actor. The fast and slow lane need each other and should work as a magnetic field that supports synergy and prevent conflicts. The guided model proved to work as a tool for making strategic plans.

Research question:

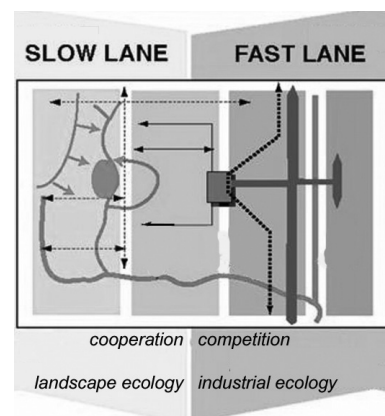
How can the two network strategy become an effective tool in urban planning?

Evaluation

The main goal of this strategy is to give an overall guideline for both planners as designers to develop strategic plans for cities. Working with a topic of adapting to climate change, there is a need to work with a strategy that creates a flexible and durable frame that is responding to changes. The two network strategy can therefore be an usable tool to work with the perception of change. Within my project I will perceive the two network strategy as blue and green networks and how they can be an effective tool in urban planning.



Three action-oriented integration perspectives (Tjallingii, 1996)



Activities model of the two networks strategy (Tjallingii, 2015)

Projects

Daniel Jaramillo H. + Claudia Rodríguez Q. (2009)
*Reserva El Peñón, Valle de Bravo, 200 hectares,
Housing development*

La Reserva el Peñón is a country housing development located close to the small city of Valle de Bravo, Mexico. It is situated on a sloped terrain at the transition of a humid temperate climate to a tropical dry forest of pines and oaks. The site was formally used for pasture, grassing and extraction of fuel wood, which lead to different stages of degradation. The development of the area was therefore grounded on the premise that the intervention and use of the site will enable a better human-ecological performance than if left to non-managed regeneration. The main undertaking lies in rehydrating the landscape: Holding enough water on site as a base for human settlement. The land use design implemented on site has had a positive impact by regenerating the ecological functioning through a territorially, culturally and ecologically informed design and a precisely regulated use of the site and its resources. The hydrological design facilitates the storage of water in soils, biological resources, bodies of water and water harvesting tanks for direct human consumption. The project is calculated to be one-hundred percent water self-sufficient for human and domestic animal consumption as well as landscape productivity. Once the system is saturated, meaning that the communal and individual plots, the forest, hedges and meadows are hydrated, and the lakes are full, the water runs off from soils and follows its natural course, leaving behind a bountiful territory which functions ecologically and socially better through design.

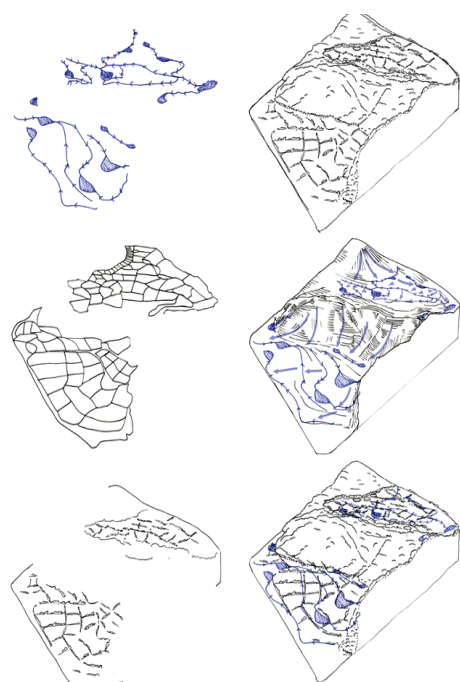
Research questions:

How can programming of space, initiate resettlement and address human-ecological challenges within the landscape practice?

How can the usually engineering questions broad into the realm of inhabited landscapes?

Evaluation

This project has the ability of modifying a landscape in such way that it can address site specific challenges. I see this landscape engineering approach as one of my design strategies for my diploma project.



Interaction of topography and water flows (Daniel Jaramillo H. 2009)



Trench and vehicular road



Filtrating lake edge



Upper storage lake



Vegetal isle in installation



Isolated space



Installation within natural environment

Selbing J. & Vogel, A (2013) *Courtesy of Nature*,
Grand-Métis, Quebec, 25 m2, Installation

The *Courtesy of Nature* was part of the 2013 edition of the International Garden Festival in North America, a contemporary garden festival exhibiting temporary installations. For this edition, the architects produced “a contextual installation that invites the visitor to reflect upon our relation to nature.” (Selbing & Vogel, 2013) Where they ask themselves the questions “if nature is something to cherish? To protect? To tame? Or to exploit?” (Selbing & Vogel, 2013)

The garden festival asks designers to create new objects to be placed on existing exhibition grounds, but what Selbing and Vogel did, was the opposite. They designed an object around the already existing living elements like ferns and trees, to instead cherish what is already there. By isolating a part of the forest, the vegetal isle became an artwork. Expecting to see something different once entered the object, surprisingly it is the same portion outdoors. The seemingly suddenly appears as the extraordinary.

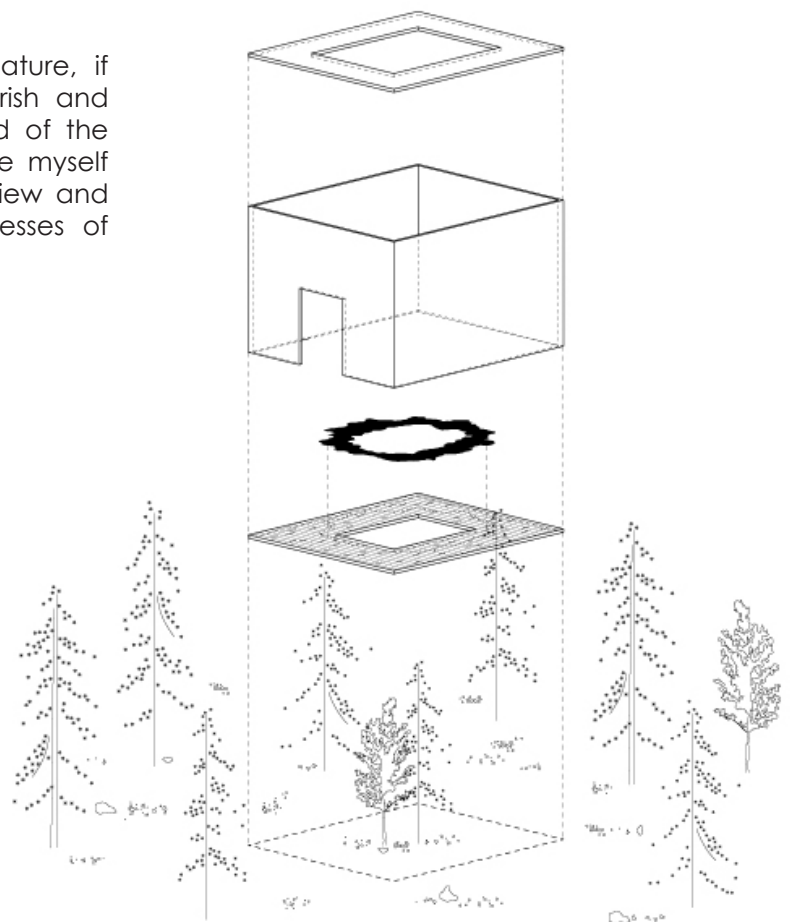
Research question:

How can the beauty of nature be reflected, by measures of dissecting, isolating and framing?

Evaluation

This project reflects a philosophy of nature, if nature is something to protect or cherish and if it can bring the extraordinary instead of the seemingly? Sharing this philosophy, I see myself and my diploma evolving on how to view and value nature, researching in the processes of ecosystem services.

All images courtesy of Anouk Vogel, 2013



Diagrammatic concept

Turenscape Landscape Architecture (2014) *A Resilient Landscape: Yanweizhou Park in Jinhua City, 26 hectares, Park*

Yanweizhou Park lies in the heart of Jinhua, an urbanized city with a population of over one million people. The three rivers, Wuyi, Yiwu and Jinhua, have been dividing the densely populated communities in the area for years. As a response of this inaccessibility, the cultural facilities and green spaces became underutilized and the Yanweizhou wetland was destroyed or fragmented by sand quarries. With the Yanweizhou being the one last piece of natural riparian wetland left, the city aimed to preserve and protect it from disappearing.

Instead of just protecting the last piece of natural riparian wetland, Turenscape also managed to stimulate habitats for native bird species, connecting the once separated communities of the city and providing a program that adapts to the yearly monsoon floods to protect the city from flooding. The main strategies used were: preservation, adaptation, cut-and-fill with a strong focus on the cultural and social identity of Jinhua. 'The project has given the city a new identity and is now acclaimed as its most poetic landscape.' (Turenscape, 2014)

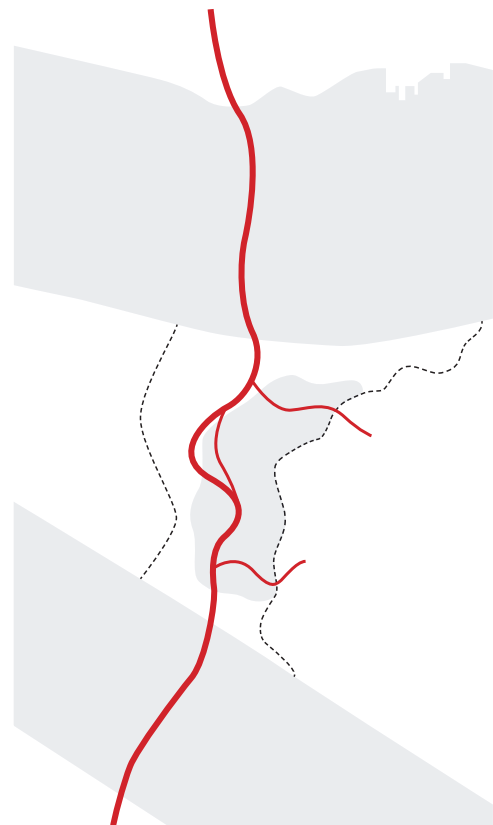
Research question:

How can separated city districts be connected to strengthen the community and cultural identity of a city and simultaneously adapt to seasonal flooding?

Evaluation

This project not only addresses the issue of flood but also responds to inaccessibility and lack of (social) identity within a city scape. The multifunctional approach and design strategies of preservation, adaptation and cut-and-fill, are an inspiration towards my diploma. The bridge will represent the bridging over municipalities and city districts based on the watershed of Lørenskog.

All images courtesy of Turenscape, 2014



Bridge with existing water and potential flooding area



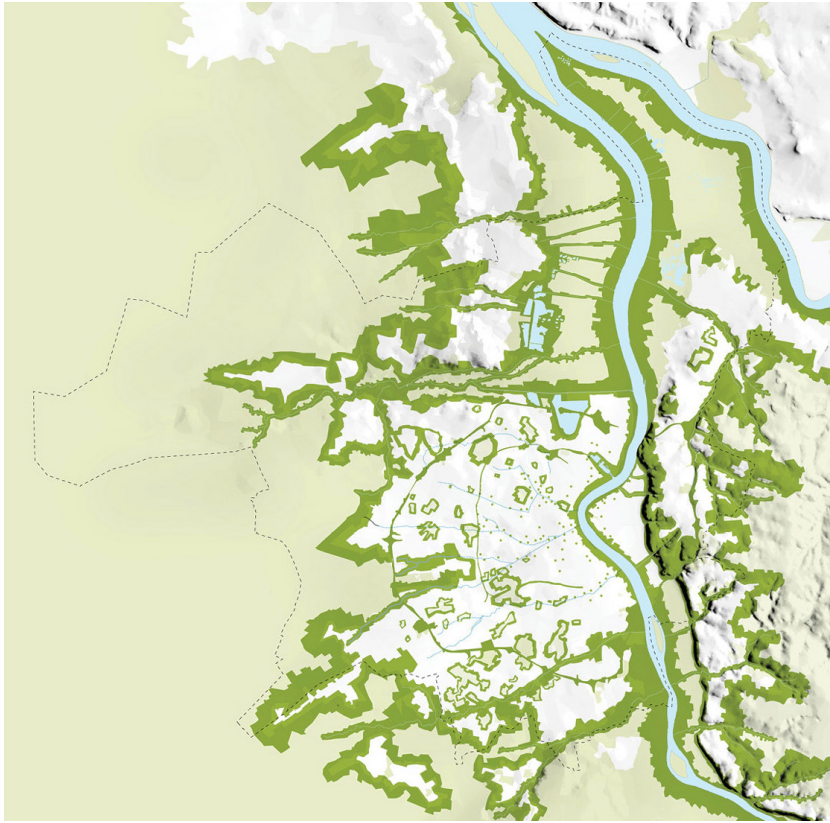
Aerial view during dry season



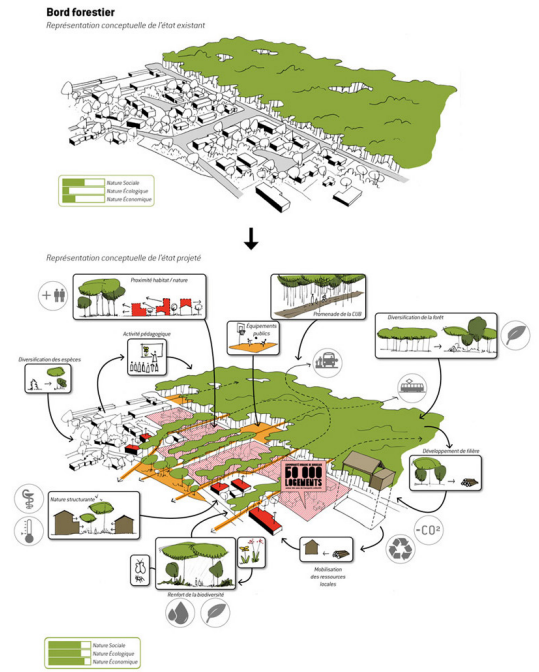
Aerial view during wet season



Bridge over flooding area



Edges map of nature vs city



Conceptual drawing



Site impression

All images courtesy of Agence Ter (2014)

Zone inondable

Agence Ter (2014) BORDEAUX / 55 000 ha for Nature, Territorial study vs De Urbanisten (2016) Good green is golden, Zwolle, Research by design

““Good Green is Golden” proposes a reinterpretation of urban green-blue networks as infrastructural systems where traditional values of public space are combined with green values in ecosystem services.”(De Urbanisten, 2016) The project by Agence Ter focusses on the role of nature in the metropolitan area of Bordeaux where edges of water, forest, agriculture, park and infrastructure are the base for future urban development. To conclude, these references refer to the sort and scale of project I imagine to do for my final diploma work.



Quantification of added green value, applying the tool Teeb.stad

Ecosystem services applicable to urban public spaces



Model 1: Zwolle Superspons

Model 2: Singelstad Zwolle

Model 3: Zwolle Randmeren

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